GUINEA

Introduction

Surveys of the performance of the roads sector were carried out by the RMI/SSATP in the mid-1980s and again in the period 1997/9. At the RMI Annual Coordinating Committee Meeting in Saly Senegal, May 2001, it was agreed to update the performance survey in order to monitor the progress of the reform process and also to seek to assess the impact of reforms on the performance of the roads sector in the RMI countries.

A survey was carried out in Tanzania from February 26 to March 7, 2002 as a first test of the methodology. Based on the experiences gained a survey was carried out in Zambia from April 17 to 23, which utilized a slightly modified methodology for assessment of the progress of reforms. Then in order to get a complete sample, this survey was also made in West Africa, in Guinea and Cote d'Ivoire. The assessment of impact of reforms is in Guinea carried out by utilization of an impact model formulated in the GAMS modeling system. This report presents the results of the Guinea methodology test.

The team[*] had meetings with relevant stakeholders: the *Directeur National de l'Entretien Routier*, the *Chef de la division financière de l'Entretien Routier* (head of the financing department for road maintenance), the *Chef de la division Suivi et Programmation de l'Entretien Routier* , the newly appointed *Directeur Général du Fond Routier*, the *Directeur National du Génie Rural*, the *Chef de la division entretien de la Direction du Génie Rural*, and the *Président de l'Union des Transporteurs Routiers*, see List of persons met, Annex 1.

Results of the Survey

The survey seeks to assess:

1) **implementation of road sector reforms**: This assessment of the implementation of reforms based on the RMI-principles is carried out on the basis of the questionnaire applied in the most recent performance survey by Mr. Sylte, see Section 2 below;

2) **impact of road sector reforms:** This assessment is carried out with the use of the basic formulas of the RED-model (Roads Economic Decision Model). Analyses of the sustainability of the existing road network and of a long-term development scenario for the road network has been prepared to illustrate impact of reforms, see Section 3 below.

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[*] Dr. Gueye, RMI - Country Coordinator, Guinea and Nicolas Gohel, consultant, RMI.

Implementation of Road Sector Reforms

The implementation of reforms of the roads sector was assessed with the assistance of the *Direction Nationale de l'Entretaine Routier* (see above), the *Directeur Général du Fond Routier*, and a representative from the *Union Nationale des Transporteurs Routiers de Guinée* (UNTRG).

The above panel carried out individual assessments of the progress of implementation of reforms based on the questionnaire used in earlier surveys. The specificity here is the early stage in the RMI process, all the reforms are on their way and nothing is effective yet (it should start before the end of this year). That explains why the situation three years ago was irrelevant, because there was no major reforms for the past three years. The second very important aspect of this survey is the great expectation on the new Road Fund, noticeable in the very high marks for next year. The assessment of the implementation of reforms varied between the members of the panel, thus indicating that the assessment is subjective and not independent of the institution the panel members represent. However, the utilization of this questionnaire has been justified by the need for continuity in the assessment of implementation of road sector reforms and comparison with earlier assessments. The assessment of the progress of implementation of reforms is carried out by averaging the scores of the panel.

Table 1: Assessment of implementation of road sector reform 2002

Building block	Today	Next year
BB1 Ownership	5	87
BB2 Financing	44	97
BB3 Responsibility	62	89
BB4 Management	43	77

Unfortunately, the initial ratings are slightly underestimated, because all the focus is on tomorrow; they are not taking into account that great efforts have been made to improve BB1 and BB4 and that the road users were always informed about road programs and new decisions in the sector. Also, the road sector management has changed a lot these last 2 years; all the work contracts are awarded on the tender basis and every year there are at least 2 financial audits carried on (one by the Ministry of Finance and one by the financiers, represented by European Union). In order to give a better picture of the actual situation, the mission decided to upgrade a little bit today's marks.

Building block	Today	Next year
BB1 Ownership	30	87
BB2 Financing	60	97
BB3 Responsibility	80	89
BB4 Management	60	77
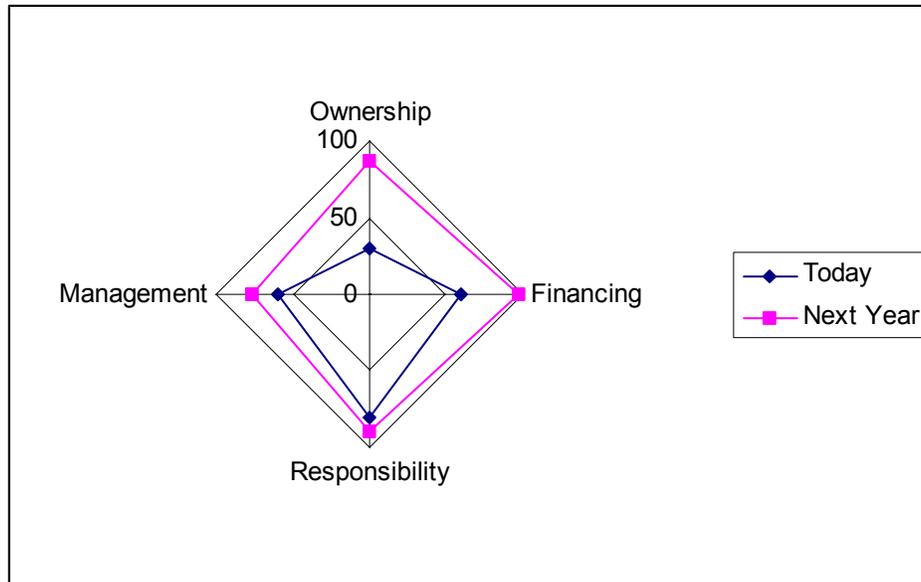
The assessment indicated that:

- **Ownership** today there is no independent council involving the representatives of the private sector, explaining the very low score. But the *Conseil d'Administration* as it should be organized will include a majority of members from the private sector (five from the public, five from the private and another one who can be from either but who is assumed to come from the private sector). People now wait to see it in place.

- **Financing** the reform should lead to a drastic shift from a typical financing process coming from the budget to an independent road fund directly funded by the fuel levy paid by the oil companies. This system should also prevent the delay in the payments of the firms. On this aspect there is a great confidence.

- **Responsibility** a new classification has been designed for the road network and the data related to this new classification are being gathered and should be available in September of this year. This new classification defines very clearly the responsibilities, following the decentralization process in Guinea. But today's classification is also clear. The concession of the tolls and axle road controls will also be in place before June 2004.

- **Management** this is the weakest part. Although the force account has completely disappeared in 1989 after a major privatization (the Ministry of Public Work and Transport does not possess any force account crew or a single road equipment; all the works are done by private contractors), the private sector has some difficulties to develop itself. The *Direction Nationale de l'Entretien Routier* is trying to provide training, but today, only three or four good contractors can be found. They used not to answer the bids, mainly because they knew that with the former system, there were delays in payments. As quoted in the financing aspects, the latter should disappear. This issue is very important, because with the arrival of the extra funds

from the tolls and the axle controls, there could be a situation where the market will not be able to respond to the increase in demand.

Impact of road sector reforms

Presentation of data

The present condition of the network of the routes nationales, regionales, and the pistes rurales is illustrated in Table 2:

Table 2: Actual road condition 2001/2 (km)

		Failed	Fair	Good
National	earth	2 124.636	1 083.354	298.010
National	gravel	267.072	1 480.128	748.800
National	double surface	139.564	560.142	243.294
National	bituminous	110.775	300.675	643.550
Regional	earth	2 284.620	1 164.930	320.450
Regional	gravel	321.000	1779.000	900.000
Rural roads	earth	13 499.000	5 098.500	1 402.500
Rural roads	gravel	374.500	2 075.500	1 050.000

Source: *Direction Nationale de l'Entretien Routier, Direction du Génie Rural*

In Table 2 the roads are split in the former functional classification. Indeed, the data on the new classification are not available yet. The rural roads are going to be under the responsibility of the local communities, but because of their weak capacity, the Génie Rural, under the authority of the Ministry of Agriculture, provides support. The regional roads are under the responsibility of the *Direction Nationale de l'Entretien Routier*, like the national roads. The new classification will only alter the regional roads. Some of them (the biggest) will become national roads, while the other will become *Routes Prefectorales*, under the responsibility of the prefectorales communities, also supported by the *Génie Rural*. The main priority of the Road Fund will be to maintain the national roads. Only 8% of the rural roads are eligible for funding, and they represent less than 10% of the total funding of the road fund.

The expected lifetime of the roads has been assessed in Table 3:

Table 3. Expected lifetime of roads (years)

bituminous	15
double surface	8
gravel	3
earth	2

Source: DNER and DNGR

The expected lifetime is an important parameter for the assessment, as the indicators are based on the assumption that the roads will have a linear deterioration if they are subject to routine maintenance only. The linear deterioration assumes that the road will remain 1/2 of the lifetime in 'good' condition, 1/2 of the lifetime in 'fair'. After the end of the lifetime the roads are assumed to deteriorate to 'failed' condition if none periodic maintenance activities are carried out to improve the condition of the road.

All the detailed costs could be found in the *Note de Présentation de l'Entretien Routier pour l'année 2001*. The division chiefs (for the DNER and the DNGR) also provided very useful information for the aggregation of the data to represent the routine and the periodic maintenance costs. Some already aggregated maintenance costs could also be found in the report prepared for the Plan National des Transports. Other missing costs were assessed with the help of Dr Gueye.

The routine maintenance costs assessed by the DNER to be necessary for securing the lifetime of the roads are presented in Table 4:

Table 4. Routine maintenance costs (1000 USD per km)

	Good	Fair
bituminous	1.5	3.25
double surface	1.95	4.23
gravel	1.25	0.4
earth	0.125	0.075

Source: DNER and DNGR

The routine maintenance costs presented in the above Table represents average costs per km assessed to be necessary to secure the lifetime of the investments. For the terre ordinaire (ordinary earth), the cost is very low, representing manual work of the local communities. For the gravel roads, the cost is higher, representing the treatment of the critical points and the use of mechanized work. For the bituminous roads, the usual treatment consists in mechanized clearance of the pits and the surface. When it comes to fair level, there is much more work in order to fill the holes in the paved surface. Eventually for the double surface treatment, the price from the paved surface were taken and slightly increased (about 30%).

The costs of improving the condition of the roads are summarized in Table 5.

Table 5. Periodic maintenance costs (Cost 1000 USD per km)

	Fair	Good
bituminous.failed	43	75
bituminous.fair		31.9
double surface.failed	56	97.5
double surface.fair		41.4

gravel.failed	5	11.25
gravel.fair		7
earth.failed	1.5	4.75
earth.fair		2.5

Source: DNER and DNGR

The periodic maintenance costs have been estimated by the division chief responsible for each type of road (DNER or DNGR), and extracted from the *Note de Presentation de l'Entretien Routier pour l'année 2001* and the *Plan National des Transports*.

Table 5 reads in the first line that the cost of improving paved roads (periodic maintenance) from 'failed' to 'fair' condition is 43 thousand USD per km, and from 'failed' to 'good' 75 thousand USD per km. The second lines mean that improving paved roads from 'fair' to 'good' condition costs 31.9 thousand USD.

The vehicle operating costs were derived from the RED-model formulas based on speed parameters set by the DNER for the various road standards and conditions. The vehicle operating costs were computed for the paved roads and the roads in improved earth by the model, and then slightly increased respectively for the roads with surface treatment and in ordinary earth, after discussion with Dr Gueye and the division chiefs. The vehicle operating costs are presented in Table 6:

Table 6. Vehicle operating cost (USD per km)

	Failed	Fair	Good
earth	0.80	0.60	0.45
gravel	0.70	0.50	0.35
double surface	0.59	0.38	0.25
bituminous	0.52	0.33	0.22

Source: RED-model calibrated to Guinea, see Annex.

Sustainability of the present road network in Guinea.

The sustainability of the network is analyzed based on the assumption that the road network should be adequately maintained based on the routine maintenance rates established by the DNER. Furthermore, the roads should be improved in order to sustain the present condition when they deteriorate to a lower road condition. The funding necessary to secure adequate routine maintenance of the present road network is presented in Table 7.

Table 7. Routine maintenance needs (1000 USD per year)

Rural roads	2700.40
Regional roads	1011.98
National roads	6432.90

To secure adequate routine maintenance of the present network of rural roads it is assessed that there is a need for about 2.7 million USD per year. For national and regional roads, however, the need for funds to maintain these roads is about 7.5 million USD per year.

Table 8. Sustained improvement of road condition (km per year)

	Failed	Fair	Good
Rural roads			
earth.failed	11401.500	5098.500	
earth.fair		1402.500	
gravel.failed	374.500	683.667	700.000
Regional roads			
earth.failed	3282.096	1673.544	
earth.fair		460.360	
gravel.failed	144.878	264.481	270.800
National roads			
earth.failed	2124.636	1083.354	
earth.fair			298.010
gravel.failed	267.072	487.552	499.200
double surface.failed	139.564	140.035	
double surface.fair			60.823
bituminous.failed	110.775	40.090	
bituminous.fair			85.807

Table 8 summarizes the reinvestment or periodic maintenance and rehabilitation activities that are necessary per year in order to sustain the present condition of the road network. It should be noted, however, that roads in 'failed' condition upgraded to 'failed' condition appear in the Table (about 17 800 km). These roads are not in a maintainable condition and not included in the maintenance plans and may as such not be considered to be part of the present core network.

In Table 9 the total cost of reinvestment to sustain the present condition of the road network is summarized.

Table 9. Reinvestment cost (1000 USD per year)

Rural roads	22457.71
Regional roads	8033.55
National roads	25247.64

For rural roads, the annual need for maintenance funding to maintain the present condition of the network amounts to about US$ 2.7 million for routine maintenance and about USD 22.5 million for periodic maintenance activities. When only the eligible network for the pistes rurales is selected (8%), this figure falls to 1.8 million. The huge need for the nationales roads is due to the periodic maintenance of the section with surface treatment, around 10.4

million for only 943 km. This periodic maintenance is partly funded by the Road Fund, and partly by the donor agencies.

For the past three years, the actual allocation to the Road Fund has been around 6.5 million, which is very close to the actual needs. As the new Road Fund should bring around 7 million, it will almost allow the funding of the routine maintenance for the network. But the priority of the Road Fund is to be able to finance the complete maintenance of the nationales roads. So there is still a huge gap between the required and the available funds.

Assessment of the adequacy of the services of the roads network

The present condition of the road network of Guinea was discussed from the point of view of the road condition offered the road users. Based on the maintenance cost data and the vehicle operation cost data a sensitivity analysis was made to identify the road condition, which minimize the total cost of sustaining the network. The sum of road user cost, routine maintenance cost and the periodic maintenance costs needed to secure the desired road condition. The indicator model in this way will for a given traffic level increase the road condition, if this reduces the total cost associated with the operation of the vehicles, and the maintenance of the roads.

Below follows a summary of the sensitivity analyses for selected major road classes and road standards in Guinea.

Rural roads

For the rural roads in ordinary earth the analysis shows that at traffic levels below 15 vehicles per day the road users would benefit from a 'failed' road condition. For traffic levels of 25 vehicles and higher the increased cost of maintaining 'good' road condition would be justified from the road user savings in vehicle operation cost.

Table 10. Analysis of traffic levels – rural earth roads

Traffic	5.00	15.00	25.00	35.00	45.00
Failed	16500.00	16500.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00
Good	0.00	0.00	16500.00	16500.00	16500.00
Total	24106.50	72286.50	111065.63	138166.88	165268.13
Routine	0.00	0.00			
Periodic	16.50	16.50	41250.00	41250.00	41250.00
VOC	24090.00	72270.00	67753.13	94854.38	121955.63

The DNGR indicated that traffic levels of about 10 vehicles par day would reflect the road users demand for service of the earth roads.

For gravel roads the analysis shows that for traffic levels below 45 vehicles per day the road users could only expect a 'failed' service level as the reduction in vehicle operation costs from

improved road condition cannot be justified by the reduction in vehicle operating costs. Only a traffic above 55 vehicles per day justify a 'good' network.

Table 11. Analysis of traffic levels – gravel roads

Traffic	35.00	45.00	55.00	65.00	75.00
Failed	3500.00	3500.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00
Good	0.00	0.00	3 500.00	3 500.00	3 500.00
Total	31 302.25	40 244.75	45 300.21	49 771.46	54 242.71
Routine	0.00	0.00	4 375.00	4 375.00	4 375.00
Periodic	3.50	3.50	16 333.33	16 333.33	16 333.33
VOC	31 298.75	40 241.25	24591.88	29 063.13	33 534.38

In connection with a future development scenario, a traffic of 15 vehicles per day has been adopted.

Regional roads

The regional roads are all earth roads. First, let's have a look at the gravel roads. Below a traffic of 44 vehicles per day, a 'failed' service is enough. Above 50 vehicles per day, the road should be maintained in 'good' condition. And between the two, half of the roads should be kept in 'good' condition, and half in 'fair' condition.

Table 12. Analysis of traffic levels – regional gravel roads

Traffic	44.00	46.00	48.00	50.00
Failed	1 354.00	0.00	0.00	0.00
Fair	0.00	677.00	677.00	0.00
Good	0.00	677.00	677.00	1 354.00
Total	15 223.02	15 856.36	16 276.43	16 659.84
Routine	0.00	1 117.05	1 117.05	1 692.50
Periodic	1.35	5 077.50	5 077.50	6 318.67
VOC	15 221.67	9 661.81	10 081.88	8 648.68

In order to reflect the actual condition of the network and the will to maintain a 'fair' level of service on many of the regional roads, a traffic of 47 vehicles per day has been chosen.

The regional gravel roads should be kept in a 'good' condition for a traffic level of 25 and above, and 'failed' otherwise.

Table 13. Analysis of traffic levels – regional earth roads

Traffic	15.00	20.00	25.00	30.00	35.00
Failed	5 416.00	5 416.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00
Good	0.00	0.00	5 416.00	5 416.00	5 416.00
Total	23 727.50	31 634.86	36 456.45	40 904.34	45 352.23
Routine	0.00	0.00	677.00	677.00	677.00
Periodic	5.42	5.42	1 340.00	1 340.00	1 340.00
VOC	23 22.08	31 29.44	22 39.45	26 87.34	31 35.23

Here, a traffic level of 20 vehicles per day is the best representation of the reality, so these roads should be kept in 'failed' condition.

National roads

To aggregate the data for the national roads was a difficult task. Whereas the average is about 350, the standard deviation is of 680. And from this analysis was removed the data from the point Conakry, km 36, with a traffic of 10 648 vehicles per day.

For the national earth roads, any traffic level above 30 vehicles per day justifies the road to be maintained in 'good' condition. Otherwise, it can be left 'failed'.

Table 14. Analysis of traffic levels – national earth roads

Traffic	20.00	30.00	40.00	50.00	60.00	70.00
Failed	3506.00	0.00	0.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00	0.00
Good	0.00	3 506.00	3 506.00	3 506.00	3 506.00	3 506.00
Total	20 478.55	26 479.07	32 237.67	37 996.28	4 3754.88	49 513.49
Routine	0.00	438.25	438.25	438.25	438.25	438.25
Periodic	3.51	8765.00	8 765.00	8 765.00	8 765.00	8765.00
VOC	20 475.04	17 275.82	23 034.42	28 793.03	34 551.63	40 310.24

For these roads, a traffic level of 50 vehicles per day has been chosen.

The national gravel roads should be kept in 'failed' condition unless the traffic level is above 50 vehicles per day.

Table 15. Analysis of traffic levels – national gravel roads

Traffic	30.00	40.00	50.00	60.00	70.00
Failed	2496.00	2496.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00
Good	0.00	2 496.00	2 496.00	2 496.00	2 496.00
Total	19 134.34	25 511.62	30 711.20	33 899.84	37 088.48
Routine	0.00	0.00	3 120.00	3 120.00	3 120.00
Periodic	2.50	2.50	11648.00	11648.00	11 648.00
VOC	19 131.84	25 509.12	15 943.20	19 131.84	22 320.48

Due to the very high traffic average, a high traffic of 100 vehicles per day has been selected for the national gravel roads.

The national double surface roads should be kept in 'good' condition for a traffic higher than 100 vehicles per day, and the same for the national bituminous roads. Anyway, the traffic considered for those two roads are about 400 vehicles per day, so the national roads with these surfaces should be kept in 'good' condition.

Table 16. Analysis of traffic levels – national double surface roads

Traffic	50.00	100.00	150.00	200.00	250.00
Failed	943.00	0.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00
Good	0.00	943.00	943.00	943.00	943.00
Total	10 154.70	20 203.77	24 506.21	28 808.65	33 111.09
Routine	0.00	1838.85	1838.85	1838.85	1838.85
Periodic	0.94	9760.05	9760.05	9760.05	9760.05
VOC	10 153.75	8 604.87	12 907.31	17 209.75	21 512.19

Table 17. Analysis of traffic levels – national bituminous roads

Traffic	50.00	100.00	150.00	200.00	250.00
Failed	943.00	0.00	0.00	0.00	0.00
Fair	0.00	0.00	0.00	0.00	0.00
Good	0.00	943.00	943.00	943.00	943.00
Total	10 154.70	20 203.77	24 506.21	28 808.65	33 111.09
Routine	0.00	1838.85	1838.85	1838.85	1838.85
Periodic	0.94	9760.05	9760.05	9760.05	9760.05
VOC	10 153.75	8 604.87	12 907.31	17 209.75	21 512.19

Summary of service levels for development scenario

In the Table below the traffic levels are summarized for the service levels the road users would require of the different road classes:

Table 18. Traffic levels of the development scenario

	Earth	Gravel Bituminous	Double	surface
Rural roads	10	15		
Regional roads	20	47		
National roads	50	100	400	400

The traffic levels in the above Table are used for analysis of the sustainability of the development scenario, which seeks to represent and achieve the service levels the road users would require of the road network in Guinea.

Analysis of sustainability of the development scenario where the road users desired service levels are achieved

The sustainability of the road network with road conditions as specified by the road users desired service levels are analyzed like the analysis of the present road condition.

In Table 19 below, the road conditions are summarized that can be justified from the traffic levels that correspond to the service levels required by the road users.

Table 19. Road condition in Development scenario (km)

	Failed	Fair	Good
national .earth			3 506.000
national .gravel			2 496.000
national .double surface			943.000
national .bituminous			1 055.000
regional .earth	5 416.000		
regional .gravel		677.000	677.000
rural roads .earth	16 500.000		
rural roads.gravel	3 500.000		

The table above shows that the total national network should be kept in 'good' condition. On the opposite, the pistes rurales should be left (this is almost what is happening in the reality, with only 8% of the pistes rurales eligible to be funded). As the table 20 below shows, the regional network should not be allowed to deteriorate below fair. The strategy to keep half of the regional gravel roads in 'fair' and half in 'good' condition is to let them fall to fail condition and to upgrade 451.33 km of these roads in good condition every year. In fact, that is the 2/3 of the roads that fall from 'fair' to 'failed' condition.

Table 20. Improvement of road condition (km per year)

	Failed	Good
National roads		
earth. fair		3 506.000
gravel. fair		1 664.000
double surface. fair		235.750
bituminous. fair		140.667
Regional roads		
earth. failed	5 416.000	
gravel. failed	451.333	
Rural roads		
earth. failed	16 500.000	
gravel. failed	3500.000	

In Table 21 below the routine maintenance costs, which are adequate for the development scenario are summarized.

Table 21. Routine maintenance cost

	earth	gravel	double surface	bitumeux
national	438.250	3 120.000	1 838.850	1 582.500
regional		1 117.050		

The total routine maintenance costs amounts to US$ 8,1 million for the development scenario.

In Table 22 below the vehicle operating costs are summarized for the development scenario:

Table 22. Vehicle operation cost (1000 USD per year)

	earth	gravel	double surface	bituminous
national	28 793.025	31 886.400	34 419.500	33 886.600
regional	31 629.440	9 871.845		
rural roads	48 180.000	13413.750		

The total vehicle operating cost of the development scenario amounts to USD 232 million annually.

In Table 23 below the reinvestment necessary to sustain the road condition specified in Table 19 is summarized:

Table 23. Reinvestment cost (US$ 1000 per year)

Regional roads	5077.50
National roads	36066.98

The total cost of compensating for the deterioration of the road network amounts in the development scenario to about US$ 41 million per year.

Analysis of maintenance funding deficit on the performance of the development scenario road network

In the following indicators of the impact of a funding deficit on the performance of the roads network is summarized.

The analysis is carried from the starting point that the road fund revenues are sufficient to sustain the road network of the development scenario. Only 8% of the pistes rurales are kept in the analysis, as it is how it's going to be organized very soon. The pistes rurales kept are those in improved earth. A budget constraint is introduced in the analysis in which the funding deficit is gradually increased, while the indicator model seeks to minimize the impact on the total cost of operating the network.

In Table 24 below the results of the analysis are presented. In the Table three levels of funding deficit are indicated.

Present: The present funding level of routine and periodic maintenance (both from the road fund and the donor agencies) of USD 9.6 million corresponds to a funding deficit of 83%.
Expected: The expected funding level of routine and periodic maintenance for 2005, which corresponds to the latest analysis made for the Plan National des Transports (PNT). This brings us to a deficit of 75%.
Scenario: Which represents the service level the road users would expect based on the traffic levels indicated by DNER and DNGR. This funding level corresponds to the road users indicated expectations.

The indicator model identifies for the given funding level the sustainable road conditions of the network that minimizes the total cost of operating the road network at the traffic levels indicated in the development scenario.

The ideal scenario is far from being reached in the analysis: even with what is expected, no roads other than the paved and treated ones can be maintained.

The difference of service level between the expected budget and the present budget are summarized in the table 24 below. The only difference is on the national roads with enduit, with only 172.74 km kept in 'good' condition.

But the budget today is on the edge of a very dangerous situation. One more step towards the 90% of deficit and:

- All the double surface roads are left in 'failed' condition.
- The paved roads cannot be fully maintained any more. Only 800 km can be maintained (around 75% of the total length of paved roads). This degradation has a huge cost.

Table 24. Analysis impact of routine maintenance funding deficit

```
Roads:  national-earth
Deficit %       0.30     0.60     0.75  │ 0.83     0.90
failed          0.00  2158.09  3506.00  │ 3506.00 │3506.00
fair            0.00     0.00     0.00  0│00      0.00 │
good         3506.00  1347.91     0.00  │  0.00     0.00

Roads:  national-gravel
Deficit %       0.30     0.60     0.75  │ 0.83     0.90
failed         23.95  2496.00  2496.00  │ 2496.00 │2496.00
fair         1236.02     0.00     0.00  │0.00      0.00 │
good         1236.02     0.00     0.00  │0.00      0.00 │

Roads:  national-double surface
Deficit %       0.30     0.60     0.75  │ 0.83     0.90
failed          0.00     0.00   402.31  770.26   943.00
fair            0.00     0.00     0.00  0│00      0.00 │
good          943.00   943.00   540.69  │172.74    0.00

Roads:  national-bituminous
Deficit %         0.30     0.60     0.75     0.83  │ 0.90
failed            0.00     0.00     0.00   0.00   258.99
fair              0.00     0.00     0.00  0│00      0.00 │
good           1055.00  1055.00  1055.00  1055.00 │ 796.01

Roads:  regional-earth
Deficit %       0.30     0.60     0.75  │ 0.83     0.90
failed       5416.00  5416.00  5416.00  │ 5416.00  5416.00
fair            0.00     0.00     0.00  0│00      0.00 │
good            0.00     0.00     0.00  0│00      0.00 │

Roads:  regional-gravel
Deficit %       0.30     0.60     0.75  │ 0.83     0.90
failed       1354.00  1354.00  1354.00  │ 1354.00  1354.00
fair            0.00     0.00     0.00  0│00      0.00 │
good            0.00     0.00     0.00  0│00      0.00 │

Roads:  rural gravel
Deficit %       0.30     0.60     0.75  │ 0.83     0.90
failed       1600.00  1600.00  1600.00  │ 1600.00  1600.00
fair            0.00     0.00     0.00  0│00      0.00 │
good            0.00     0.00     0.00  0│00      0.00 │

MCroutine   -1.19  -1.19  -1.43  -3.04  -5.18
Routine      5899.04   4368.62   2636.84   1919.35 │ 1194.02
Reinvestment 33697.55 26742.98 11504.80  7696.96    4462.63
Vehicle ope 203161.32 221781.35 270339.95 288604.61 308523.19
Total Cost   242757.90  252892.95  284481.59  298220.92   314179.84
Road fund    39596.58  31111.60  14141.64    9616.31    5656.65
```

Scenario ← ----- Expected   Present
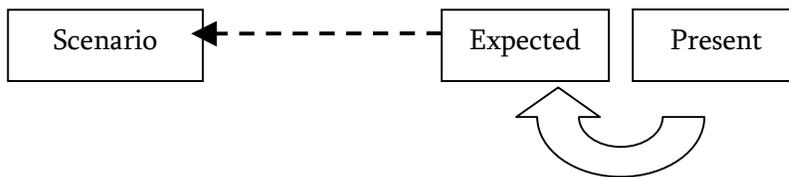
A graphical overview of the impact of the funding deficit is presented below:
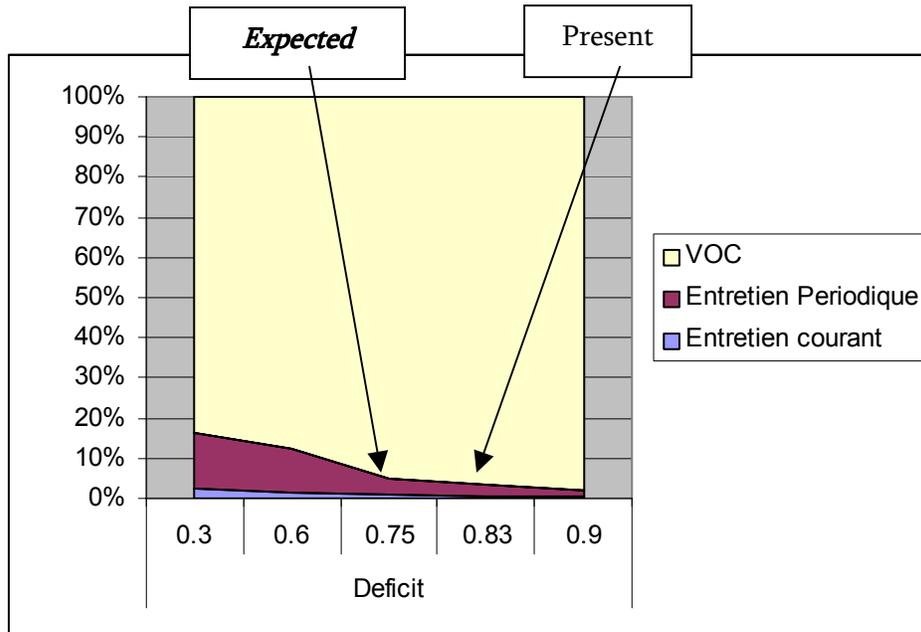
The Figure gives a clear indication of the relative sized of the costs of operating the road network system. The reduction in maintenance funding from 75% deficit to 83% has an impact on the other cost components: the reinvestment requirements and the routine maintenance are reduced as the target road conditions are reduced. The user cost, however, is significantly increased, as the reduction in the road condition increases the vehicle operating costs.

In the graph below the relationship between the funding gap for routine maintenance and its impact on increased cost of the roads sector illustrated based on the Guinean data:
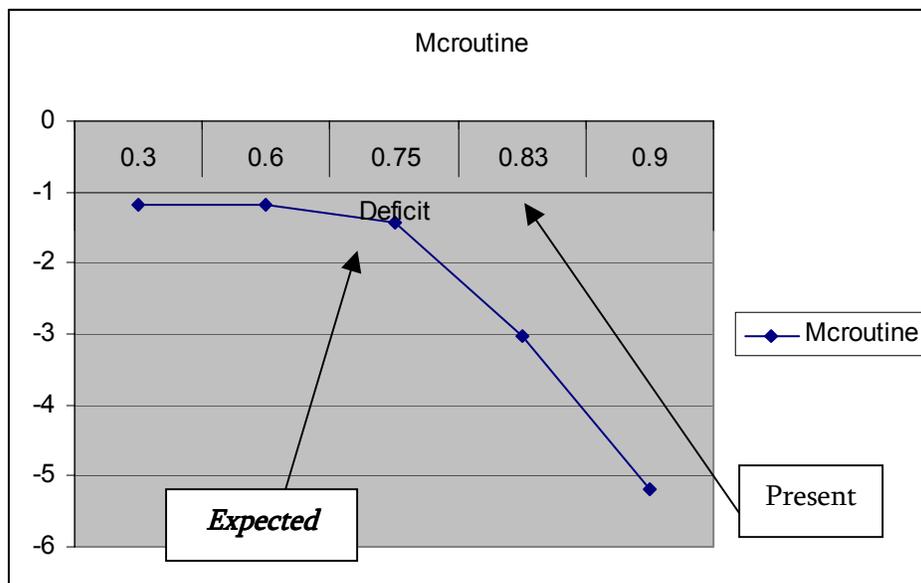
The graph illustrates that at the *expected level* an increase in the funding deficit of US$ 1 would increase the total cost of operating and maintaining the roads network by close to US$ 1.5. At the *present* funding level, however, the situation is more difficult: An increase in the funding deficit of US$ 1 would increase the cost with about US$ 3 of higher vehicle operating cost due to the deterioration of the road condition. And this graph also illustrates that Guinea today is on a dangerous slope, very close to the 90% where an increase in the funding deficit of US$ 1 would increase the cost with about US$ 5. This very short analysis brings exactly the same conclusion with another explanation for the move toward a 75 % deficit level, promoted in the Plan National des Transports: to get out of this dangerous area where Guinea stands today for the funding of its roads.

ANNEX 2: **Table: Estimated Vehicle Operating Costs** (RED Model)

Bituminous

iri	Car ($/veh-km)	Pickup ($/veh-km)	Small Bus ($/veh-km)	Medium Bus ($/veh-km)	Medium Truck ($/veh-km)	Heavy Truck ($/veh-km)	Artic. Truck ($/veh-km)	VOC weighted	
bx02	0.13	0.20	0.11	0.19	0.51	0.66	1.00	0.22	good
bx13	0.20	0.31	0.14	0.24	0.72	0.88	1.38	0.33	fair
bx25	0.34	0.52	0.24	0.38	1.02	1.21	2.01	0.52	failed
Composition	25.75	41.375	18.75	1	4.75	5.875	2.5	100.00	

Gravel

Iri	Car ($/veh-km)	Pickup ($/veh-km)	Small Bus ($/veh-km)	Medium Bus ($/veh-km)	Medium Truck ($/veh-km)	Heavy Truck ($/veh-km)	Artic. Truck ($/veh-km)	VOC weighted	
bz11	0.21	0.31	0.14	0.23	0.69	0.86	1.31	0.35	good
bz22	0.32	0.48	0.22	0.34	0.95	1.13	1.84	0.50	fair
bz25	0.35	0.54	0.24	0.38	1.03	1.22	2.01	0.55	failed
Composition	10	40	5	30	10	3	2	100.00	